	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Undergraduate Physics Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Corrosion	4520102108		T=2	P=0	ECTS=3.18	5	July 18, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Prof. Dr. Munasir, S.Si., M.Si.

Learning model	**Case Studies**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	This lecture is intended as a vehicle for students to practice conducting academic studies both reference-based and real-world investigations related to corrosion problems. This activity is carried out in the lecture room to study and discuss corrosion phenomena, concepts and theories using the latest references. This is then continued with investigative activities which are packaged in the form of independent projects for each student. The output of this lecture is in the form of academic presentations in the form of peer seminars, articles and posters on the results of projects that have been planned, research activities that have been carried out, and scientific products that have been communicated.
References	**Main :**
	1. Pierre R. Roberge. 2000. Handbook of Corrosion Engineering . New York: McGraw-Hill
	Supporters:
Supporting lecturer	Dr. Zainul Arifin Imam Supardi, M.Si.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	Students understand the scope of corrosion studies	Mastering the study of the scope of corrosion study material	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review references, discussions, and presentations 2 X 50			0%
2	Students master the concept of corrosion due to acidic, neutral and alkaline environments	Able to provide arguments for the phenomenon of corrosion in metals due to acidic, neutral and alkaline environments	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review references, discussions, and presentations 2 X 50			0%
3	Students master the concept of corrosion due to electrochemical processes	Able to analyze electrochemical processes on electrodes in materials that experience corrosion	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review references, discussions, and presentations 2 X 50			0%

4	Students master the study of corrosion thermodynamics	Able to analyze: free energy, standard electrode potential, Nernst equation, thermodynamic calculations, reference electrodes, corrosion potential measurements, measurements, Ph, and pH potential diagrams	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review the 4 X 50 references, discussions, and presentations			0%
5	Students master the study of corrosion thermodynamics	Able to analyze: free energy, standard electrode potential, Nernst equation, thermodynamic calculations, reference electrodes, corrosion potential measurements, measurements, Ph, and pH potential diagrams	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review the 4 X 50 references, discussions, and presentations			0%
6	Students master the study of corrosion kinetics	Able to analyze events: overpotential, polarization activation, polarization concentration, and Ohmic Drop	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review references, discussions, and presentations 2 X 50			0%
7	Students master the application of electrochemical techniques to material corrosion	Able to explain the application of electrochemical techniques for: measuring corrosion due to electrochemical polarization, monitoring corrosion, cathode protection, anode protection, aluminum anode coating, and chloride extraction	**Criteria:** 1. Assessment Aspects: 1) cohesiveness of discussion, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Review references, discussions, and presentations 2 X 50			0%

8	Students are able to complete UTS	Solving corrosion problems conceptually and comprehensively	**Criteria:** 1. A = 4 correct answers, 2. B = 3 correct answers, 3. C = 2 correct answers, and 4. D = 1 correct answer,	Independent written exam 2 X 50			0%
9	Students master planning independent material corrosion projects of their choice	Able to explain material corrosion experiment planning according to their choice	**Criteria:** 1. Assessment Aspects: 1) planning documents, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Independent study and presentation 4 X 50			0%
10	Students master planning independent material corrosion projects of their choice	Able to explain material corrosion experiment planning according to their choice	**Criteria:** 1. Assessment Aspects: 1) planning documents, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Independent study and presentation 4 X 50			0%
11	Students master the implementation of independent material corrosion projects of their choice	Able to carry out material corrosion experiments of his choice	**Criteria:** 1. Assessment Aspects: 1) experimental procedure documents, 2) truth of substance, 3) smoothness of experiment 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	6 X 50 self-experiment			0%

12	Students master the implementation of independent material corrosion projects of their choice	Able to carry out material corrosion experiments of his choice	**Criteria:** 1. Assessment Aspects: 1) experimental procedure documents, 2) truth of substance, 3) smoothness of experiment 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	6 X 50 self-experiment			0%
13	Students master the implementation of independent material corrosion projects of their choice	Able to carry out material corrosion experiments of his choice	**Criteria:** 1. Assessment Aspects: 1) experimental procedure documents, 2) truth of substance, 3) smoothness of experiment 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	6 X 50 self-experiment			0%
14	Students communicate project results in the form of articles and posters	Able to carry out scientific communication by presenting the results of his project in slides, articles and posters on corrosion of materials of his choice	**Criteria:** 1. Assessment Aspects: 1) scientific product documents, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Independent exposure 4 X 50			0%

15	Students communicate project results in the form of articles and posters	Able to carry out scientific communication by presenting the results of his project in slides, articles and posters on corrosion of materials of his choice	**Criteria:** 1. Assessment Aspects: 1) scientific product documents, 2) correctness of substance, 3) smooth presentation 2. Assessment criteria: 3. A = 3 aspects of the assessment are met, 4. B = 2 assessment aspects are met, and 5. C = 1 aspect of the assessment is met	Independent exposure 4 X 50			0%
16							0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
		0%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.